LISTING OF CLAIMS

This listing of claims will replace all prior versions and listings of claims in the application:

Claims 1-21 (Canceled).

Claim 22 (Currently Amended): A method for optical characterization of at least one layer of material in an interval A of values taken by a function α of an optical wavelength λ, when λ varies in an interval of wavelengths, the at least one layer being created on a substrate, the method comprising:

1) carrying out a set of reflectometry and/or ellipsometry measurements over the interval A <u>with ellipsometric and/or reflectometric devices and a spectrometer</u>, the set of measurements leading to a measured spectrum, marked ψ, and choosing methods for calculating associated with a nature of the measurements and with a type of layer to be characterized;

2) choosing m initial values $\alpha_1 \ldots \alpha_m$ of the function α, belonging to the interval A, m being a whole number at least equal to 1, and defining an interval B as being the set of points α of the interval ranging from the smallest to the biggest number among $\alpha_1 \ldots \alpha_m$, when m is greater than 1, and as being the interval A when m equals 1;

3) choosing m complex initial values of a complex refraction index $n^*=n+jk$ for the m points α_i, i ranging from 1 to m;

4) when m is not 1, choosing an interpolation law that allows calculating the refraction index $n(\alpha)$ of the material over the interval B, from the points (α_i, n_i), with $n_i=n(\alpha_i)$, i ranging from 1 to m, and when m equals 1, $n(\alpha)$ is taken equal to the number $n1(\alpha 1)$ over the entire interval B;

5) choosing M variable parameters, M being less than or equal to 2m+1;

6) choosing an error function $Er(\psi, \overline{\psi})$ that characterizes the difference between a measured spectrum ψ and a theoretical spectrum $\overline{\psi}$;

7) using a minimizing function of $Er(\psi, \overline{\psi})$ with M parameter, performing:

a) by applying the interpolation law of (α_i, n_i) over the interval B, deducing $n(\alpha)$, α belonging to B;

b) by using $n(\alpha)$ and the thickness ϵ of the layer, and methods for calculating spectrums, calculating a theoretical spectrum $\overline{\psi}$ $(n(\alpha),\epsilon)$;

c) comparing ψ and $\overline{\psi}$ by using $Er(\psi, \overline{\psi})$ and, if $Er(\psi, \overline{\psi})$ is less than a predetermined value e, or is minimal, going to sub-step e), otherwise going to sub-step d);

d) making the M variable parameters vary so as to tend to the minimum of $Er(\psi, \overline{\psi})$, and returning to sub-step a);

e) if $Er(\psi, \overline{\psi})$ is less than e, then obtaining a set of M variable parameters, for which $Er(\psi, \overline{\psi}(n(\alpha,M),\epsilon))$ is minimal and the refraction index is then taken equal to the last one obtained, and if $Er(\psi, \overline{\psi})$ is greater or equal to e going to step 8);

8) increasing the number m of initial values of the function α and returning to step 2).

Claim 23 (Previously Presented): A method according to claim 22, further comprises increasing the number of initial values of the function α by adding one or plural values to extant initial values.

Claim 24 (Previously Presented): A method according to claim 23, further comprising increasing the number of initial values of the function α by replacing the extant initial values with new initial values whose number is greater than the number of extant initial values.

Claim 25 (Previously Presented): A method according to claim 23, wherein each interpolation law is chosen from among linear interpolation laws, cubic interpolation laws, polynomial interpolation laws, and interpolation laws of spline function type.

Claim 26 (Previously Presented): A method according to claim 22, wherein the initial values of the function α are evenly distributed over the interval A, the distribution of the nodes thus being homogenous.

Claim 27 (Previously Presented): A method according to claim 22, wherein $\alpha(\lambda)$ is chosen among λ, $1/\lambda$ and hc/λ, where h is the Planck's constant and c the speed of light in vacuum.

choosing m initial wavelengths $\lambda_1 \ldots \lambda_m$ belonging to the interval, m being a whole number at least equal to 1, and associating a refraction index to each wavelength;

choosing an interpolation law at least for the refraction index of the material, for wavelengths lying between the initial wavelengths $\lambda_1 \ldots \lambda_m$;

choosing M initial parameters, M being at least equal to m, an initial refraction index n_i for each initial wavelength λ_i, $1 \leq i \leq m$, the initial wavelengths being chosen so as to determine via interpolation at least the refraction index for any wavelength within the interval [λ min, λ max], couples (λ_i, n_i) being nodes;

choosing reflectometry and ellipsometry methods of calculation;

choosing an error function Er, representative of the difference between two spectrums ψ_1 and ψ_2, the spectrums ψ_1 and ψ_2 being calculated or measured over a number of points greater than the number m of nodes;

using the m initial wavelengths, the M initial parameters, and the interpolation law, implementing an optimization process of:

determining a theoretical spectrum, marked $\overline{\psi}$, depending on the chosen methods of calculation, and on the index deduced via interpolation of its value at λ_i, i ranging from 1 to m, over the spectrum [λmin, λmax];

determining the error $Er(\psi, \overline{\psi})$, between the measured spectrum and the theoretical spectrum;

minimizing the error by varying the position of the values of the unknown indexes and/or the thickness of the layer and/or the values of the refraction indexes with initial wavelengths, and obtaining a spectrum;

adding other wavelengths to the initial wavelengths $\lambda i \ldots \lambda m$, the added wavelengths constituting new nodes;

repeating the method by choosing a number m' of initial wavelengths, m' being greater than m, and M' initial parameters, M' being greater than M, until the accuracy of each spectrum thus best represented is equal to a predetermined accuracy.

Claim 33 (Previously Presented): A method according to claim 32, wherein m is at least equal to 2.

Claim 34 (Previously Presented): A method according to claim 32, wherein m is at least equal to 1 and equal initial refraction indexes are chosen.

Claim 35 (Previously Presented): A method according to claim 32, wherein the material is non absorbent and the number M is equal to m, the extinction coefficient of the material being set equal to 0.

Claim 36 (Previously Presented): A method according to claim 32, wherein:

M is at least equal to 2m;

the method further comprising:

choosing an interpolation law for the extinction coefficient of the material;

Claim 28 (Previously Presented): A method according to claim 22, further comprising measuring the error, at 6), over an interest interval C which is included in the interval B or equal to the interval B.

Claim 29 (Previously Presented): A method according to claim 22, wherein the M variable parameters are real parts of the refraction indexes at points α_i, i ranging from 1 to m.

Claim 30 (Previously Presented): A method according to claim 22, wherein the M variable parameters are imaginary parts of the refraction indexes at points α_i, i ranging from 1 to m.

Claim 31 (Previously Presented): A method according to claim 22, wherein the M variable parameters are constituted by the thickness of the material for which the refraction index is searched.

Claim 32 (Currently Amended): A method for optical characterization of at least one layer of a material in an interval of wavelengths [λ min, λ max], the at least one layer being created on a substrate, the method comprising:

carrying out a set of reflectometry and/or ellipsometry measurements <u>with ellipsometric and/or reflectometric devices and a spectrometer</u>, the set of measurements leading to a measured spectrum, marked ψ;

each initial wavelength λi, $1 \leq i \leq m$, choosing an initial extinction coefficient k_i, the initial wavelengths furthermore being chosen so as to be able to determine via interpolation the extinction coefficient for any wavelength of interval [λ min, λ max];

within the optimization process, minimizing the error by also varying values of the extinction coefficients at the initial wavelengths, and further placing the added wavelengths so as to best represent the spectrum of the extinction coefficient of the material.

Claim 37 (Previously Presented): A method according to claim 36, wherein m is equal to 1 and equal initial refraction indexes and equal initial extinction coefficients are chosen.

Claim 38 (Previously Presented): A method according to claim 32, wherein the layer of material has a thickness less than coherence length of light used for measuring, and further comprising choosing an additional initial parameter of an initial layer thickness, and in the optimization process the error is minimized by also varying the value of the layer thickness.

Claim 39 (Previously Presented): A method according to claim 32, wherein the layer of material is thick, and M is at most equal to 2 m.

Claim 40 (Previously Presented): A method according to claim 32, wherein the thickness of the layer of material is known with a predetermined accuracy and M is at most equal to 2 m.

Claim 41 (Previously Presented): A method according to claim 32, wherein each interpolation law is chosen from among linear interpolation laws, cubic interpolation laws, polynomial interpolation laws, and interpolation laws for example of spline function type.

Claim 42 (Previously Presented): A method according to claim 32, wherein a distribution of the nodes is homogenous.